

## Question 5

Suppose you add two vectors  $\vec{\mathbf{A}}$  and  $\vec{\mathbf{B}}$ . What relative direction between them produces the resultant with the greatest magnitude? What is the maximum magnitude? What relative direction between them produces the resultant with the smallest magnitude? What is the minimum magnitude?

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### Solution

If the vectors are parallel, their sum will have the highest magnitude:

$$|\vec{\mathbf{A}} + \vec{\mathbf{B}}| = |\vec{\mathbf{A}}| + |\vec{\mathbf{B}}|.$$

If the vectors are antiparallel, their sum will have the lowest magnitude:

$$|\vec{\mathbf{A}} + \vec{\mathbf{B}}| = \left| |\vec{\mathbf{A}}| - |\vec{\mathbf{B}}| \right|.$$